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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/660,909	09/13/2000	Dean S. Susnow	219.38758X00	7436

7590

01/07/2004

c/o Anne Richards
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EXAMINER

PHAN, MAN U

ART UNIT

PAPER NUMBER

2665

DATE MAILED: 01/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/660,909

Applicant(s)
Susnow et al.

Examiner
Man Phan

Art Unit
2665



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Sep 13, 2000
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13, and 15-21 is/are rejected.
- 7) ☒ Claim(s) 7, 14, and 22 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

DETAILED ACTION

1. The application of Susnow et al. for a "Multi-lane receiver de-skewing" filed 09/13/2000 has been examined. Claims 1-22 are pending in the application.

Drawings

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Objections

3. Claim 12 is objected to because of the following informalities: This claim is depended on claim 11 which is the same as claim 12. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8-9, 11-13 and 1-2, 4-6 and 16-17, 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thacker (US#5,313,501) in view of Collins et al. (US#6,031,847).

With respect to claims 8-9, 11-13, both Thacker (US#5,313,501) and Collins et al. (US#6,031,847) disclose a novel system and method for de-skewing streams of digital data at a receiving station by respectively delaying them in accordance with their respective measure elapsed time, so that parallel bits of data are received simultaneously from the parallel data streams, according to the essential features of the claims. Thacker discloses in Fig. 2 a block diagram illustrated two digital data processing system with a transmission line for sending digital data over parallel paths from the first system to the second system, in which at the destination device 104, each data signal is received by a de-skewing buffer 110 which is part of the device's data receiver circuit 112. The de-skewing buffers 110-1 to 110-N delay the received data by a sufficient amount to align each data stream with the receiver's clock. The deskewed data signals output from the parallel de-skewing buffers 110 are approximately synchronized with the receiver's clock signal and are also synchronized with each other, and are thus suitable for parallel transmission over data lines Data1 to DataN within the destination device 104, such as on an internal data bus. The purpose of the de-skewing buffers is to add sufficient delay to align transitions in each data signal with the latch clock signal (Col. 3, lines 35 plus). Thacker further teaches in Fig. 1 a block diagram illustrated a set of parallel transmission lines with different propagation delays and a set of de-skewing buffers, in which when a start bit is received, the data stored in the data latches in the de-skewing buffer

representing the phase of the received digital signal is retained until the end of the burst transmission. The de-skewing buffer also contains a multiplexer which outputs a selected one of data signals from the tapped delay line in accordance with the values of the comparison signals. The selected data signal is sampled and latched at each clock cycle, thereby generating a deskewed data signal. The deskewed data signals output from the parallel de-skewing buffers are approximately synchronized with the receiver's clock signal and are also synchronized with each other (Col. 2, lines 29 plus and Col. 8, lines 1 plus). In the same field of endeavor, Collins et al. discloses a method and system for de-skewing parallel bus channels includes a receiver, a plurality of channel inputs built into the receiver, and a delay stack structure coupled to the plurality of channel inputs. The receiver is adapted to accept data from a parallel data transfer cable. The channel inputs couple to each of the individual communications channels which comprise the parallel data transfer cable. The delay stack structure includes a plurality of delay stacks, each coupled to a respective channel input. Each delay stack dynamically selects an additional delay amount for its respective communications channel such that each communications channel of the parallel data transfer cable is deskewed with respect to the others. In so doing, the distances across which data can be received and the speeds at which data is transferred via the parallel data transfer cable is increased (See Figs. 3-5; Col. 4, lines 14 plus).

Regarding claims 1-2, 4-6, they are method claims corresponding to the apparatus claims 8-9, 11-13 above. Therefore, claims 1-2, 4-6 are analyzed and rejected as previously discussed with respect to claims 8-9, 11-13.

With respect to claims 16-17, 19-21, These claims differ from claims Thacker in view of Collins in that the claims recited a computer program product for performing the same basis of steps and apparatus of the prior arts as discussed in the rejection of claims 8-9, 11-13. It would have been obvious to a person of ordinary skill in the art to implement a computer program product in Thacker in view of Collins for performing the steps and apparatus as recited in the claims with the motivation being to provide the efficient enhancement to lane de-skewing in a multi-lane receiver, and easy to maintenance, upgrade.

One skilled in the art would have recognized the need for effectively and efficiently providing a method and system for aligning data received on a plurality of data lanes, and would have applied Collins's novel use of the frame alignment techniques with delay stack structure in the multiplexed data stream into Thacker's de-skewing parallel streams of digital data transmitted from a source to a destination. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Collins's method and system dor de-skewing parallel bus channels into Thacker's method and apparatus for de-skewing digital data with the motivation being to provide a method and system for the alignment and de-skewing data lanes in a multi lane receiver.

6. Claims 10, 15 and 3 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thacker (US#5,313,501) in view of Collins et al. (US#6,031,847), as applied to the claims above, and further in view of Brown et al. (US#6,553,505).

With respect to claims 10 and 15, Thacker and Collins et al. disclose the claimed limitations discussed in paragraph 5 above. This claim differs from the claims above in that the claims require a plurality of lane tolerance counters for measuring the elapsed times. In the same field of endeavor, Brown discloses a method of performing timing de-skew in order to properly receive digital computer information. N sequences of clock pulses are generated, the generated sequences having phases offset from one another by intervals of T/N , where N is at least 2 and T is a duration of one bit-cell time, and where one cycle of each of the sequences has a duration of $2T$. A transmitting portion generates a test signal. The test signal is received at a receiving portion. An identifying portion identifies which one of the generated sequences of clock pulses and corresponding polarities is aligned with the test signal. The identified one of the generated sequences of clock pulses and the corresponding polarities are used to determine which one of the generated sequences of clock pulses and corresponding polarities to use to receive the digital computer information (See Fig. 1B & 4A; Col. 1, lines 35 plus).

Regarding claim 3, It's a method claim corresponding to the apparatus claim 14 above. Therefore, claim 3 is analyzed and rejected as previously discussed with respect to claim 10.

With respect to claim 18, This claim differs from claim Thacker in view of Collins and Mann in that the claims recited a computer program product for performing the same basis of steps and apparatus of the prior arts as discussed in the rejection of claim 10. It would have been obvious to a person of ordinary skill in the art to implement a computer program product in Thacker in view of Collins and Mann for performing the

steps and apparatus as recited in the claim with the motivation being to provide the efficient enhancement to lane de-skewing in a multi-lane receiver, and easy to maintenance, upgrade.

One skilled in the art would have recognized the need for effectively and efficiently providing a method and system for aligning data received on a plurality of data lanes, and would have applied Mann's lane specific deskew logic counters used for determining lane skew order, and Collins's novel use of the frame alignment techniques with delay stack structure in the multiplexed data stream into Thacker's de-skewing parallel streams of digital data transmitted from a source to a destination. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Mann's processor for determining physical lane skew order, and Collins's method and system for de-skewing parallel bus channels into Thacker's method and apparatus for de-skewing digital data with the motivation being to provide a method and system for the alignment and de-skewing data lanes in a multi lane receiver.

Allowable Subject Matter

7. Claims 7, 14 and 22 are objected to as being dependent upon the rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

8. The following is an examiner's statement of reasons for the indication of allowable

subject matter: The closest prior art of record fails to disclose or suggest wherein the control state machine monitors elapsed time from a first detection of the predetermined data element on any of the plurality of data lanes by one of the plurality of elapsed time detectors and declares a de-skewing failure upon the monitored elapsed time reaching a predetermined amount before the predetermined data element has been detected on all of the plurality of data lanes by the plurality of data element detectors, as specifically recited in claims 7, 14 and 22.

9. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Vila et al. (US#6,654,824) is cited to show the high speed dynamic multi-lane deskew.

The Mejia et al. (US#6,658,363) is cited to show the digital data pattern detection methods and arrangements.

The Kennedy et al. (US#6,536,025) is cited to show the receiver de-skewing of

multiple source synchronous bits from a parallel bus.

The Mann (US#6,625,675) is cited to show the processor for determining physical lane skew order.

The Noland et al. (US#6,044,121) is cited to show the method and apparatus for recovery of time skewed data on a parallel bus

The Lee et al. (US#5,719,862) is cited to show the packet-based dynamic de-skewing for network switch with local or central clock

The Hall (US#5,774,697) is cited to show the data realignment method and apparatus.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (703)305-1029. The examiner can normally be reached on Mon - Fri from 6:30 to 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (703) 308-6602. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3988.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

12. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 305-9051, (for formal communications intended for entry)

Or: (703) 305-3988 (for informal or draft communications, please label

"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021

Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Mphan

01/05/2004.

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